Discovery and characterization of endosymbiotic flagellates from Australian termites

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Termites are effective decomposers of wood, many utilizing endosymbiotic flagellates in their hindguts to aid digestion. Few studies have been conducted on the protistan fauna of Australian termites. Samples collected from 65 colonies of lower termites (Rhinotermitidae, Kalotermitidae, Mastotermitidae and Termopsidae) in north-eastern Australia were examined by light and electron microscopy. A total of 44 flagellate species were found belonging to 4 parabasalid orders (Cristamonadida, Trichonymphida, Spirotrichonymphida, and Trichomonadida) and one preaxostylid order (Oxymonadida). Only 14 flagellate species had previously been described, the remaining 30 were putative novel species. Oxymonads were only found in kalotermitids; cristamonads in all termite families except rhinotermitids; and trichomonads, trichonymphids and spirotrichonymphids were most abundant in rhinotermitids. The variable host specificity of the flagellates may be associated with host diet: kalotermitids feed on sound wood, termopsids on decaying wood and rhinotermitids on the whole range. Electron microscopy revealed many starch-feeding flagellates contained hydrogenosomes while most particulate-feeding flagellates contained hypersymbiotic bacteria, although several flagellates possessed neither.